

CLAIMS

What is claimed is:

- 1 -

A device for heat sealing at least two thermoplastic films together, the device
5 comprising:

front and rear opposing jaws moveable between an open position defining a zone
for inserting the at least two films between the front and rear jaws and a closed position in which
the front and rear jaws are proximate each other to compress the at least two thermoplastic films
together, the rear jaw including a resilient portion facing the front jaw, the resilient portion
10 having a given cross-sectional thickness;

a rear jaw release sheet adjacent to the resilient portion of the rear jaw, the rear
jaw release sheet including an unreinforced release material;

a front jaw release sheet positioned between the insertion zone and the front jaw
when the front and rear jaws are in the open position, the front jaw release sheet including an
unreinforced release material;
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a heating element positioned between the front jaw release sheet and the front
jaw, the heating element having a cross-sectional thickness no less than about 0.55 times the
cross-sectional thickness of the resilient portion; and

at least one recoiler having a first end attached to the front jaw release sheet and a
20 second end attached to the front jaw, wherein the recoiler disengages the front jaw release sheet
from the heating element when the front and rear jaws are in the open position.

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The device of claim 1 wherein the cross-sectional thickness of the heating element
is no less than the cross-sectional thickness of the resilient portion.

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The device of claim 1 wherein the cross-sectional thickness of the heating element

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is no less than about 2.0 times the cross-sectional thickness of the resilient portion.

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The device of claim 1 wherein the heating element is at least partially embedded in the rear jaw.

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The device of claim 1 for heat sealing at least two thermoplastic films having a given transverse width, wherein when the front and rear jaws are in the closed position, the front jaw release sheet conforms to greater than 20% of the surface area of the heating element that is within the transverse width of the at least two thermoplastic films.

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The device of claim 1 wherein the unreinforced release material is a fluoroplastic material.

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A method of simultaneously sealing and severing at least two thermoplastic films, the method comprising:

inserting the at least two thermoplastic films in the insertion zone of the device of claim 1;

moving the front and rear jaws to the closed position whereby the at least two thermoplastic films are pressed together between the front and rear jaws;

applying an electrical impulse to the heating element to increase the temperature of the heating element to a point sufficient to simultaneously sever and heat seal the at least two thermoplastic films; and

discontinuing the electrical impulse to the heating element while the front and rear jaws are in the closed position to set the heat seal.

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The method of claim 7 wherein the total thickness of the at least two thermoplastic films is no more than about 0.004 inches.

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5 A device for heat sealing at least two thermoplastic films together, the device comprising:

front and rear opposing jaws moveable between an open position defining a zone for inserting the at least two films between the front and rear jaws and a closed position in which the front and rear jaws are proximate each other to compress the at least two thermoplastic films together, the rear jaw including a resilient portion facing the front jaw;

a front jaw release sheet positioned between the insertion zone and the front jaw when the front and rear jaws are in the open position; and

a heating element positioned between the front jaw release sheet and the front jaw, wherein the front jaw release sheet engages the heating element when the front and rear jaws are in the closed position and disengages from the heating element when the front and rear jaws are in the open position.

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The device of claim 9 wherein the front jaw release sheet includes an unreinforced release material.

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The device of claim 10 wherein the unreinforced release material includes a fluoroplastic material.

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The device of claim 9 further comprising at least one spacer attached to the front jaw release sheet, wherein the front jaw release sheet is disengaged from the heating element when the front and rear jaws are in the open position.

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The device of claim 12 wherein at least one spacer includes a recoiler.

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The device of claim 13 wherein the recoiler includes:

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a first end attached to the front jaw release sheet; and

a second end attached to the front jaw.

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The device of claim 9 wherein the surface of the resilient portion of the rear jaw facing the front jaw includes a release characteristic.

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The device of claim 9 further comprising a rear jaw release sheet adjacent to the resilient portion of the rear jaw.

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The device of claim 16 wherein the rear jaw release sheet includes an unreinforced fluoroplastic material.

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The device of claim 9 wherein:

the heating element and the resilient portion of the rear jaw each have a given cross-sectional thickness; and

the cross-sectional thickness of the heating element is no less than about 0.55 times the cross-sectional thickness of the resilient portion.

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The device of claim 18 wherein the cross-sectional thickness of the heating element is no less than the cross-sectional thickness of the resilient portion.

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The device of claim 18 wherein the cross-sectional thickness of the heating element is no less than about twice the cross-sectional thickness of the resilient portion.

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The device of claim 9 wherein the heating element is at least partially embedded in the rear jaw.

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A device for heat sealing at least two thermoplastic films together, the device comprising:

front and rear opposing jaws moveable between an open position defining a zone for inserting the at least two films between the front and rear jaws and a closed position in which the front and rear jaws are proximate each other, the rear jaw including a resilient portion facing the front jaw, the resilient portion having a given cross-sectional thickness;

a front jaw release sheet positioned between the insertion zone and the front jaw when the front and rear jaws are in the open position; and

a heating element positioned between the front jaw release sheet and the front jaw, the heating element having a cross-sectional thickness no less than about 0.55 times the cross-sectional thickness of the resilient portion.

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The device of claim 22 wherein the cross-sectional thickness of the heating element is no less than the cross-sectional thickness of the resilient portion.

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The device of claim 22 wherein the cross-sectional thickness of the heating element is no less than about 1.5 times the cross-sectional thickness of the resilient portion.

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The device of claim 22 wherein the cross-sectional thickness of the heating

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The device of claim 22 further comprising at least one spacer attached to the front sheet, wherein the front jaw release sheet is disengaged from the heating element and rear jaws are in the open position.

The device of claim 27 wherein at least one spacer includes a recoiler.

The device of claim 28 wherein the recoiler includes:
a first end attached to the front jaw release sheet; and
a second end attached to the front jaw.

The device of claim 22 wherein the surface of the resilient portion of the rear jaw
nt jaw includes a release characteristic.

The device of claim 22 further comprising a rear jaw release sheet adjacent to the front of the rear jaw.

The device of claim 31 wherein the rear jaw release sheet includes an release material.

A device for heat sealing at least two thermoplastic films together, the device

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comprising:

front and rear opposing jaws moveable between an open position defining a zone for inserting the at least two films between the front and rear jaws and a closed position in which the front and rear jaws are proximate each other to compress the at least two thermoplastic films together, the rear jaw including a resilient portion facing the front jaw;

a front jaw release sheet positioned between the insertion zone and the front jaw when the front and rear jaws are in the open position, the front jaw release sheet including an unreinforced release material; and

a heating element positioned between the front jaw release sheet and the front

10 jaw.

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The device of claim 33 wherein the unreinforced release material is an unreinforced fluoroplastic material.

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The device of claim 33 further comprising at least one spacer attached to the front jaw release sheet, wherein the front jaw release sheet is disengaged from the heating element when the front and rear jaws are in the open position.

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The device of claim 35 wherein at least one spacer includes a recoiler.

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The device of claim 36 wherein the recoiler includes:

a first end attached to the front jaw release sheet; and

a second end attached to the front jaw.

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The device of claim 33 wherein the surface of the resilient portion of the rear jaw facing the front jaw includes a release characteristic.

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The device of claim 33 further comprising a rear jaw release sheet adjacent to the resilient portion of the rear jaw.

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5 The device of claim 39 wherein the rear jaw release sheet includes an unreinforced fluoroplastic material.

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The device of claim 33 wherein the heating element is at least partially embedded in the rear jaw.

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10 A device for heat sealing at least two thermoplastic films together, the device comprising:

15 front and rear opposing jaws moveable between an open position defining a zone for inserting the at least two films between the front and rear jaws and a closed position in which the front and rear jaws are proximate each other to compress the at least two thermoplastic films together, the rear jaw having a resilient portion facing the front jaw, the resilient portion having a given cross-sectional thickness; and

20 a heating element positioned between the insertion zone and the front jaw, the heating element having a cross-sectional thickness no less than about 0.55 times the cross-sectional thickness of the resilient portion.

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The device of claim 42 wherein the cross-sectional thickness of the heating element is no less than the cross-sectional thickness of the resilient portion.

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25 The device of claim 42 wherein the cross-sectional thickness of the heating element is no less than about twice the cross-sectional thickness of the resilient portion.

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The device of claim 42 wherein the heating element is at least partially embedded in the rear jaw.

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5 The device of claim 42 wherein the surface of the resilient portion of the rear jaw facing the front jaw includes a release characteristic.

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The device of claim 42 further comprising a rear jaw release sheet adjacent to the resilient portion of the rear jaw.

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10 The device of claim 42 for heat sealing at least two thermoplastic films having a given transverse width, wherein when the front and rear jaws are in the closed position, the front jaw release sheet conforms to greater than 20% of the surface area of the heating element that is within the transverse width of the at least two thermoplastic films.